Date: Jul 18, 1994

Subject: INFORMATION: Modifying the guidance in Advisory Circular (AC) 25-17 "Transport Airplane Cabin Interiors Crashworthiness Handbook"

From: Manager, Transport Airplane Directorate,
Aircraft Certification Service, ANM-100

To: SEE DISTRIBUTION

The purpose of this memorandum is to modify the guidance in Advisory Circular 25-17 "Transport Airplane Cabin Interiors Crashworthiness Handbook," with respect to testing for head injury. The "bowling ball" test called out in AC 25-17 to provide compliance with FAR 25.785(c)(2) has been determined to be inadequate.

There are two main problems with the test. First, the definition of the test is not complete since it does not specify a weight for the bowling ball to be used in the conduct of the test. Second, the pass/fail criteria specified in the test is not a good measure of an acceptable head impact.

Tests conducted by the Civil Aeromedical Institute (CAMI) have shown that, other parameters held constant, the weight of the bowling ball can greatly influence the results. Therefore, the test is subject to non-standard application if different weighted balls are used.

A series of tests using the bowling ball criteria have been conducted by CAMI on materials which were chosen because head impact data from the 16g dynamic seat test was already in existence. Comparison of this data with dynamic seat test Head Injury Criterion (HIC) data shows that a test with an average deceleration of 130g's run within all the parameters specified in the AC exhibited a rough correlation to dynamic tests that produced HIC of over 4,000. While the HIC requirement does not apply to airplanes certificated prior to amendment 25-64, this is four times the accepted amount. Since the criteria in AC 25-17 allows an average 225g deceleration, it is clear that this is not a meaningful discriminate regarding potential for head injury. That is, passing the test as described in the AC is not an indication of an acceptable head contact surface.

The data produced by CAMI appear to offer a means to revise the criteria in AC 25-17, however, we feel that before any change to the AC is made, it should be discussed in a wider forum. In the meantime, the test listed in AC 25-17 should not be used as an absolute pass/fail test, but only be used as a comparison test to a previously approved configuration until acceptable criteria can be developed. If such tests are conducted, a bowling ball weight of approximately 13 pounds seems to yield the best results.

Prepared by: _____
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Concur: _____
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